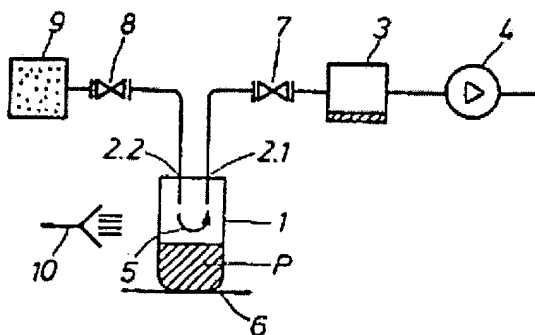


# Process and apparatus for freeze-drying a product in a vessel with a narrow opening

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## Abstract of DE3311525

In the process for freeze-drying (lyophilisation) of a product (P) in a vessel (1) with a narrow opening (2.1), the liquid product is first filled into the vessel and frozen in it, and the frozen product in the vessel is dried by sublimation of the ice. For this purpose the vessel (1) is connected during the drying via the opening (2.1) to an ice condenser (3) and a reduced pressure pump (4), and is furthermore supplied, through a second opening (2.2), with drying gas or with gas of a humidity which decreases according to the progress of the drying process. A flow (arrow 5) is thus produced in the atmosphere of the vessel (1) and flows from this second opening (2.2) to the opening (2.1) which is connected to the ice condenser (3), the pressure and temperature of the atmosphere in the vessel (1) being kept at the values desired for the sublimation.



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